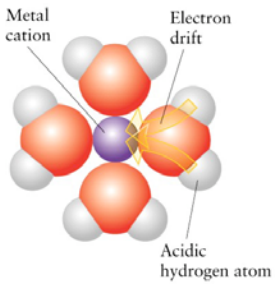
Class 7.1

Acids and Bases

CHEM 102H

T. Hughbanks

Hydrolysis of Metal Complexes can give acidic solutions



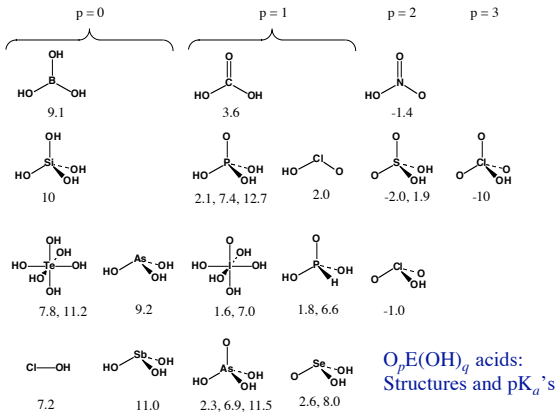
pK_a's for $[M(H_2O)_6]^{n+}$	
$[Fe(H_2O)_6]^{3+}$	2.46
$[Cr(H_2O)_6]^{3+}$	3.89
$[Al(H_2O)_6]^{3+}$	4.85
$[Fe(H_2O)_6]^{2+}$	5.89
$[Cu(H_2O)_6]^{3+}$	7.49
$[Ni(H_2O)_6]^{2+}$	9.03

Oxo Acids - Trends

For this important class of aqueous acids, rules exist for correlating and understanding trends in acidities:

Pauling's Rules for $O_pE(OH)_q$ acids:

- (1) $pK_a \approx 8 - 5p$
- (2) if $q > 1$, then successive pK_a values should increase by about 5



$O_pE(OH)_q$ acids: Structures and pK_a's

Trends for dicarboxylic acids

	pK_{a1}	pK_{a2}
oxalic	1.23	4.19
malonic	2.85	5.70
succinic	4.19	5.48
adipic	4.42	5.41

As the positions of deprotonation get further apart,the influence that that the two sites exert on each other declines.